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Patton's Spruce.

BY the increasing number of travelers who explore the high mountains of the Pacific states, which are its only home, the lovely Mountain Hemlock is now usually known as Patton's Spruce. Perhaps best considered a Hemlock, this tree differs from other Hemlocks in its long, narrow cones and in its more acute leaves usually keeled on the upper surface, and its bilobed pollen grains; and in general appearance it is one of the most distinct and beautiful of the North American conifers.

Tsuga Pattoniana, as botanists call this tree, was discovered only about forty-five years ago near Mount Baker, in northern Washington, by the Scotch collector Jeffrey, and was named out of compliment to George Patton, a Scotch lawyer, who was given to the cultivation of exotic trees, and was one of the subscribers to the fund which enabled Jeffrey to explore the forests of north-western America.

Patton's Spruce is now known to range from Alaska, where it grows at the level of the sea, southward along the mountain ranges of British Columbia, west of the continental divide, the two slopes of the Cascade Mountains of Washington and Oregon and the California Sierra Nevada, where probably on the upper waters of some of the tributaries of King's River it finds its most southern home. It is a tree of high altitudes, and, except at the extreme north, it is found only near the timber-line, forming with Pinus albicaulis and Abies lasiocarpa extensive forests.

Patton's Spruce is a tree of marvelous grace, with drooping branches clothed with thickly clustered leaves, abundant elongated narrow cones, which hang on slender spray-like branchlets, and on some individuals are bright purple, and light yellow on others in the same grove. The foliage, too, differs in color, being on some trees dark green and on others light blue-green, a peculiarity which has led to some confusion of nomenclature, the blue-leaf form often appearing in gardens as Tsuga (or Abies) Hookeriana.

Patton's Spruce grows in the greatest perfection on the slopes below Crater Lake, in the Cascade Mountains of southern Oregon, forming here extensive and nearly pure forests, in which individual trees one hundred feet high, with stout massive stems five or six feet in diameter, are abundant. Such a growth is probably not exceptional, and this tree is abundant and conspicuous at the timber-line of Mount Hood, Mount Ranier, and on the Selkirk and other mountains of British Columbia. On Mount Ranier, with Abies amabilis and Abies lasiocarpa, it forms a large part of the forest growth, growing above the banks of glaciers in great luxuriance. Some idea of the upper forest-belt on Ranier can be obtained from our illustrations in this issue; that on page 6 displays the snow-covered summit rising 8,000 feet above the timber-line, with scattered trees of Patton's Spruce on the slope in the foreground, and in the illustration on page 7 the trunks of this tree are displayed in more detail.

In Washington and Oregon Patton's Spruce grows at elevations of from 5,000 to 6,000 feet above the sea-level, but farther south the timber-line is carried higher, and John Muir, who describes this tree in his *Mountains of California* as the "most singularly beautiful of all the California conifers," found it growing on the Sierras up to 10,000 feet altitude; and on the edge of Lake Hollow, at an elevation of 9,200 feet, measured a trunk nineteen feet seven inches in circumference at four feet above the ground. "No other of our alpine conifers," he tells us, "so finely veils its strength. Its delicate branches yield to the mountain's gentlest breeze, yet it is strong to meet the wildest onsets of the gale—strong not in resistance, but in compliance, bowing snow-laden to the ground, gracefully accepting burial, month after month, in the darkness beneath the heavy mantle of winter. Every tree-lover is sure to regard it with special admiration. Apathetic miners, ever seeking only gain or gold, stop to gaze on first meeting it, and mutter to themselves 'That is a mighty pretty tree.' The deer love to lie down beneath its spreading branches; bright streams from the snow that is always near ripple through its groves, and Bryanthus spreads precious carpets in its shade. But the best words only hint its charms."

Introduced into Scotch plantations by its discoverer, Patton's Spruce has shown that it is fairly adaptable to altered climatic conditions, and it may now be seen in many European collections, and although it has not yet had sufficient time to attain maturity in cultivation, it is an ornamental tree of much promise in several European countries. Patton's Spruce, moreover, is one of the comparatively small number of the conifers of the Pacific states which thrive in the east, and although, like most alpine conifers, it grows extremely slowly at the sea-level, it has for several years withstood without injury the changeable winters and dry summers of the New England climate.

The Planting of Shrubberies.

IN furnishing small areas about modest country and suburban houses, and, indeed, for a great many other purposes in larger and more pretentious grounds, public and private, deciduous flowering shrubs are so effective in this climate that every one who wishes to plant intelligently should be familiar with their habits and with the proper way of disposing them. Of course, no place except the very smallest can dispense with trees, and in many places low-growing evergreens, especially the broad-leaved evergreens, can also be used with profit. But when we consider the beauty and variety of their flowers and foliage and fruit, and the mist of soft color which hovers about their twigs in winter, deciduous shrubs are, beyond all question, the most important element in planting small grounds. This does not mean that all shrub plantations are satisfactory, for individual plants can be dotted about a lawn in a way that is utterly meaningless. They can be used, however, so as to make a picture which has individuality and character, and in which every detail contributes distinctly to the general impression and helps to bring it out in a clear and well-defined way.

This is an art which requires study and practice, and a bulletin lately issued by Professor Bailey, of the Cornell

Experiment Station, entitled *Suggestions for the Planting of Shrubbery*, will be found useful to novices and to many who are not altogether without experience. This little pamphlet, which lays down many sound principles, illustrated in a helpful way by half-tone pictures, shows at the outset an example of the common or nursery type of planting, in which each tree and shrub is treated as a disconnected individual, and a contrasting one in which the same materials are massed about the borders of the same lawn so as to make a satisfying and consistent picture. The point emphasized is that the value of the shrubbery lies primarily in the effect of the mass, and not of the separate shrubs. Illustrations are given to show how effective a natural copse may be when it stretches across a vale on the further border of a meadow, which it makes more beautiful by the mystery of its boundary. Nature's irregular planting of this sort is always interesting because of its attractive sky-line and the wonderful play of light and shadow on the masses of foliage that advance in promontories or retreat in quiet bays, with the greensward flowing about and among them like the waters of a lake rippling along a picturesque shore. The beauty of such a boundary is not fully appreciated until we study examples of another kind, and it is emphasized in this pamphlet by the picture of shrubbery in a city lot where each plant is pruned to a definite form with its outline sharp and hard, a practice which is utterly destructive of the continuous flow of form and color which makes a natural copse so delightful. Nothing is gained by planting shrubs in masses unless the plants are allowed to mingle so that the attention is not arrested by individuals. After this principle is established it is logical to insist on the elementary rule that for small places there should be a central open space without sharply defined limits, but with a natural or apparently unstudied border; that any arrangement which gives a patchy effect should be avoided, and that shrubs should be eschewed which are only interesting for their curious forms or singular colors.

Now, what class of shrubs is the most desirable? Different persons will have various preferences, but the main point is to be sure that the bulk of the planting consists of hardy and vigorous species, and for this nothing better can be chosen than many of our native species. Every planter who has room for Roses will plant them somewhere, but the foliage and habits of garden Roses are not such as give them value in a shrub border, although some of the species, like the Japanese Rosa rugosa, have distinct merit in a mass. There is no fear that our wild shrubs will look common when transferred from the woods to the lawn, for they develop such beauty under cultivation that those alone who are well acquainted with them will recognize them as the natives of our roadsides and wood borders. Of course, no one can plant effectively unless he has an affectionate regard for the shrubs he uses, and any one who establishes intimate relations with nature has the tenderest feeling for the wild things that he finds struggling for life along brooksides and in the corners of pasture lots. This is why our native shrubs are always good for homelike pictures, and although we may take some interest in the variegated foliage and the weeping habit of the sports which are for sale in the nurseries, the greatest satisfaction will come from a sympathetic use of our own wild shrubs.

We commend this little pamphlet to our readers, not so much for its specific directions as for its general temper and the foundation principles which it lays down. One cultural rule, however, we are glad to see insisted on. This rule is, that in making a shrub group the holes for the bushes should not be made in the sod, but the entire area should be deeply spaded and the shrubs set in thickly. If small shrubs are set closely, say, eighteen inches or two feet apart, there will be no danger of a display of bare earth, for the whole surface will be practically covered with a carpet of green the first year. Under this plan, too, the plants can be hoed, and this stirring of the soil will cause a much stronger growth, while just as soon as the plants begin to crowd each other they can be lifted from what is practically a home-made nursery. In this way the planter has not only a shrub garden at once, but he has a reserve garden in which for several years he can find supplies of the very best material for use in other places. Professor Bailey says that the man who plants his shrubs in holes in the sward does not seriously mean to make any foliage-mass, and it is likely that he does not know the value of broad masses in artistic planting. Where large shrubs have open spaces between them, some low-growing, procumbent species, like the hardy Vinca or Evonymus obovatus, may be planted, but all this is another matter. The rule for continuous cultivating in shrub groups is sound in theory, and it has proved of great advantage in practice in many places.

An Outline of a Course in Horticulture.

THE first question which confronts every teacher of horticulture is: What shall be included in horticultural instruction? Shall the course be restricted to the so-called practical problems attending the propagation of fruits and vegetables, or shall it be made to include the wider field of landscape-gardening and plant-breeding, and the application of the laws of vegetable physiology? Shall we study the art of raising plants, or shall we consider the principles on which the art is founded?

For my own part, I should not regard with favor a course in horticulture which is restricted to the mechanical operations of the propagation and culture of plants. The student should know something of the origin, habits and relationships of plants, also of the causes of variation and the effects likely to be produced by the operations he may perform. In other words, he should know something about plants and their amelioration, as well as something about their cultivation. For this reason, as well as to train the powers of observation, thorough knowledge of systematic, structural and physiological botany should be at the foundation of every course in horticulture.

A knowledge of agricultural chemistry, of elementary physics and of soils is also essential, for reasons which are apparent, and this work should precede technical instruction in horticulture. Accepting this view, no course in horticulture should be offered before the junior year in our colleges.

Beginning with the junior year a twelve or sixteen weeks' course in pomology may well be introduced. The student will at this time have had sufficient training in botany to understand the necessary discussions of the distinguishing characters and the relationships of the fruits studied, while the season is favorable for a field study of orchard fruits and grapes, with special reference to harvesting and marketing. The propagation and culture of many kinds of fruits may also be studied in a practical way at this time. In some sections the season will be too far advanced for budding, but the making of hardwood cuttings, and the pruning and preparing of plants for winter, afford abundant opportunity for illustration during the whole term. The subject of pomology is naturally treated under three subheads, viticulture, small-fruit culture and orchard culture. In some sections a fourth—nut culture—might well be added. Certain general principles may be stated which will hold in each of the divisions of the subject; then the various fruits included in each may be treated specifically. The scheme adopted in my own work is similar to that of Bailey, at Cornell, and is somewhat as follows: (1) Botanical; (2) History; (3) Importance and extent of cultivation; (4) Culture and management; (5) Harvesting, storing and marketing; (6) Propagation.

The winter term may profitably be devoted to greenhouse construction and management. This course should include a careful discussion of the evolution of the modern greenhouse and of the uses and details of construction of

the various forms of forcing structures. The physics of greenhouse roofs and the principles involved in the various methods of heating, as well as the mechanical operations of building and putting in heating and ventilating apparatus, should receive most careful attention. So far as practicable it has been found advantageous for students to visit commercial houses in the vicinity in order to make intelligent comparisons of the different methods employed. Practice in making designs and estimates for the construction of different styles of houses is of special importance in this connection.

In discussing the management of the houses, watering, ventilating, etc., the student's knowledge of physiological botany will be of practical value.

The spring is preëminently the time to take up the subject of vegetable gardening. Remarks concerning preliminary work for the course in pomology will apply to this course. In other words, a knowledge of botany, of soils, of drainage and of agricultural chemistry should precede the discussion of vegetable gardening. The general treatment of the subject at the Maine State College is somewhat similar to that outlined for the course in pomology. After some general notes on market gardening as a business and the extent of the industry, the leading garden vegetables are taken up in detail. As in the case of fruits, the vegetables naturally fall into several groups; root crops, or those in which roots or underground stems are edible; Cabbage-plants, the Solanums, the Cucurbits, the Alliums, etc. In studying the different groups the general characteristics are first given, together with a discussion of the distribution and relative importance of the various members. Then each species is treated in detail in the manner described for fruits. In this way the student gets a broader conception of the subject than is possible if no system be followed.

In the laboratory work which forms a part of this course, the student is made familiar with the different kinds of garden seeds, with methods of seed-testing, with soils and garden imp'ements, as well as with the practical operations of planting, cultivating and marketing. The later operations may best be learned in detail when the student can devote his whole time to the work.

It is questionable whether, in the regular college course, more than one term may profitably be devoted to ornamental gardening. The leading object of such a course should be to arouse enthusiasm and a love for tasteful surroundings, with some ideas of the principles of taste, rather than to impart specific directions for the culture of certain species of plants. Naturally, the course should include directions as to the sources of information, and should, so far as possible, include practical demonstrations of the methods employed in managing different classes of plants. But, as a large majority of the students will be interested in this work only incidentally, it would seem that sixteen weeks is sufficient time for both landscape-gardening and floriculture. Here, however, as in all cases, local conditions must govern the policy adopted.

I should not regard the course as complete unless at least one term were devoted to a systematic study of plant-breeding. This study would properly include a consideration of the origin and distribution of cultivated plants; their variation as effected by soil climate and cultivation; the influence of heredity, the principles of selection, the methods and effects of crossing, etc. In such a course the student may obtain some idea of the possibilities in the direction of scientific horticulture.

The remaining term of the senior year may profitably be spent in the investigation of special problems and in a study of horticultural literature. This course, as also the one in plant-breeding, would naturally be made elective. Laboratory work and collateral reading should be made important features of every course in horticulture, as it is a well-recognized fact that the student retains more lasting impressions from demonstrations than from the most carefully prepared lectures. The laboratory work should, however, be accompanied by informal discussions as thoroughly systematized as the class-room instruction, and, as far as possible, should follow the same lines as those taken up in the lectures.

The foregoing notes are intended to invite discussion concerning the purpose and scope of horticultural instruction, as well as methods of teaching, rather than as a contribution of special significance. In brief, however, my ideas on the subject are here given.

Maine State College. *W. M. Munson.*

Three Natural Parks.

THE cities of Halifax, Truro and St. John, in the maritime provinces of Canada, are the possessors of parks of great natural beauty, each typical of the bold and rugged scenery which prevails on the adjacent coasts, and each one almost in its natural state. Point Pleasant Park, the oldest of the three, and formerly called Tower Woods, is on a point of land at the lower extremity of the magnificent harbor, stretching along the water-front and looking out upon the Atlantic Ocean. It occupies the entire southern end of the peninsula on which Halifax is built, and extends from the harbor on the one side to the North-west Arm, and comprises about 180 acres, the highest point being some 150 feet above the sea. Except for the eight miles of road built through it, and many delightful foot-paths, it is entirely covered with forest. The property belongs to the Imperial Government, but the city has a perpetual lease and free use of it on the conditions that no buildings are to be put on it, and no wharves or traffic allowed on its shores, while the forts, of which there are several, are to remain under the control of the Imperial Government. The park is in charge of twelve commissioners appointed by the City Council, five of whom are permanent, the others being the Mayor and six Aldermen, who hold the position until their terms in the City Council expire. The city appropriates the modest sum of $2,500 a year for the maintenance of the park. Of course, the commissioners are not paid, but the chairman devotes much of his time to the park as a labor of love. The main effort is to keep it essentially in forest and preserve its natural features. When the park was first begun, Prince Edward, the father of Queen Victoria, did much to beautify it, and his example has been followed by other distinguished commanders at Halifax since his time. The excellent roads are made chiefly by the soldiers. Except the fine iron gates at the entrance of the park, which, with considerable money to open the avenue to it, were a gift from the late Sir William Young, and a handsome keeper's lodge, in the course of erection, there is very little artificial work in this oldest of the parks of Canada. It is practically a magnificent grove of trees, making a typical forest of eastern Canada. During the last few years the commissioners have set out many young exotic trees and shrubs, but the native species have been so well preserved and kept in such prominence that the visitor finds it difficult to believe that he is not in a well-preserved natural forest. The fine Public Gardens of Halifax are not a part of the park, but are managed by a separate board.

The Victoria Park, at Truro, Nova Scotia, was founded about ten years ago, in the Queen's Jubilee year. Its situation and surroundings are romantic in the extreme. From a plateau at the top of a range of hills on the southern side of the city a stream flows down in a succession of cascades, forming a ravine which extends almost to the city limits. The stream finds its way through this ravine, now bounding over rocky ledges, now dimpling in foamy pools, until it enters a little glen, bordered with evergreen trees, about a quarter of a mile from the city. Here is the entrance to the park, rather sombre even on a bright October day, but when once the visitor enters the gorge the romantic beauty of the scene is one well fitted to captivate him. A path follows the windings of the stream for some distance, giving new views of picturesque scenery at every turn. Here a bare wall of red sandstone towers above the path for

nearly a hundred feet. On the opposite sides of the chasm the wall of rock is broken, and from the crevices are seen hanging in rich profusion such Ferns as Woodsias, Polypodium and Aspidiums, far beyond the reach of human hands. Here and there is some little dell, through which bubbles a miniature stream, its rocky banks covered with Mosses and Lichens. The largest of the falls has been named the Joe Howe Falls; it is about thirty or forty feet in height. On the bluff near by, it is proposed to erect a monument to the distinguished Nova Scotian after whom it is named; but it is to be hoped that the projectors will change their minds and either erect the monument near the entrance to the park or in the city. Any work of ornamentation in such a picturesque place would certainly be a blot. On the plateau, 200 feet above the ravine, a carriage-road extends, encircling the outer edge of the park, and numberless bypaths extend from this to points of vantage on the crags overlooking waterfalls, where on a bright October afternoon the visitor looks down on a scene of marvelous beauty, the gorgeous tints of Maples, Viburnums and Heaths darkened now by the sombre hue of evergreens, now lightened by the foam of waterfalls.

Mount Pleasant Park, at St. John, New Brunswick, situated near the city, has not yet been formally opened. It consists of 240 acres of land, some of which has been given by liberal citizens, some acquired by purchase, and some will come by expropriation. During the past two years the members of the Horticultural Association have endeavored in every possible way to interest citizens in the park scheme by planting the squares of the city with trees and flowers, and by holding exhibitions. When they have secured enough land for the park and have paid for it, the association proposes to hand it over to the city as a gift. It is hoped that the liberality and public spirit of these citizens will meet with a generous response on the part of the city government. The park site is a broken and picturesque plateau overlooking the city, intersected with ravines. A lake lies at its western extremity, from the eastern end of which a small stream finds its way over a succession of perpendicular rocks to the meadow below—forming a series of beautiful cascades about eighty feet in height. The most of the park lands so far acquired consist mainly of rocky hills and mounds covered with a growth of small shrubs, with stunted Spruces, Firs, White Birches, Maples and Cedars. The Cedars are shapely and beautiful, and if carefully handled will become one of the most beautiful ornaments of the park, the limestone formation being well adapted for their symmetrical growth. A roadway has been constructed around the lake, and it is hoped that the services of a competent landscape-gardener may be secured before anything more is undertaken. It would be a pity to go on blindly without a completed design, and a design which respects the peculiar charm of the place and which preserves and enhances it. A special feature of the park at this season is the native shrubbery which covers the rocks, and which yields the most brilliant and varied colors—stunted Vacciniums with their purple hues covering the rocks in every direction; several species of Viburnum, with their white and blue fruits in pleasing contrast, Kalmia angustifolia, Rhododendron Rhodora, Sedum latifolium, Pyrus nigra, and many others.

St. John, N. B. *G. U. Hay.*

Plant Notes.

The Lilies of our Pacific Coast.

THE Pacific coast of the United States is wonderfully rich in members of the Lily family. With nearly forty Calochorti, over twenty Brodiæas and thirty Alliums, nine Fritillarias and ten Erythroniums, as many or more Liliums, and fifty other species distributed among twenty-five genera, the Liliaceæ of the Pacific slope include a grand total of over one hundred and seventy species, in a vast and comparatively unknown region, the exploration of which annually adds new species or proves the existence of forms described by the earlier botanists and since lost sight of. I doubt if there is any other region in the world where the Lily family is so rich and varied.

The number of Liliums or true Lilies on the Coast varies according to the nomenclature followed. *The Botany of California*, published in 1880, mentions eight species and one variety. Mr. Baker more correctly, as I think, distributes the same material into fifteen species and varieties in his synopsis of the genus. These species can be divided into several groups according to their natural affinities. Lilium Washingtonianum and its varieties, with the nearly related L. rubescens, will form the first of these groups, and into the second will naturally fall L. Columbianum, L. Humboldtii and its varieties, and L. Bloomerianum, which is also known as L. Humboldtii, var. ocellatum. L. Bolanderi, too, shares in the solid ovoid bulb and leaf character of this group, although its flowers differ in form.

A third group, and a very large one it is, will contain the western relatives of Lilium superbum, large bog Lilies with rhizomatous roots and revolute flowers. These are L. pardalinum, L. Roezlii and L. Warei, with the innumerable forms of L. pardalinum, some of which, as L. Californicum, L. Bourgæi and L. puberulum, are often treated as species. This wonderfully varied group is connected by a close chain of intermediate forms, possibly crosses, with the next group, which consists of the western relatives of L. Canadense. In this group of small-flowered bog Lilies, L. parvum is nearly as various in its forms as is L. pardalinum, but L. maritimum is, as far as my observation goes, strictly monotypic. The type of L. parvum and L. maritimum have funnel-formed flowers.

Lilium Parryii is closely related to the Pardalinum group, differing only in having trumpet-shaped flowers. In growth it can hardly be distinguished from L. pardalinum.

Of these eleven species, Lilium pardalinum is most widely distributed, being scattered from central California to British Columbia, and eastwardly to the shores of Lake Winnipeg. L. Washingtonianum inhabits a long and narrow belt in the main Sierra Nevada range and in the Cascades to British America. L. Parryii is found in Arizona as well as in its original location in southern California, and L. Columbianum is found to extend far east of the Cascades in the Columbia River valley, but with these exceptions these Lilies belong to the mountainous regions of the Pacific Coast proper in the Sierra Nevada and Coast ranges. I have already written of L. Washingtonianum and its varieties (vol. ix., p. 448), and of L. rubescens (vol. ix., p. 493). In an early issue I hope to write of L. Humboldtii and its allies.

Ukiah, Calif. *Carl Purdy.*

Cultural Department.

Notes on Cypripediums.

AT no period of the year is a good collection of Cypripediums entirely flowerless, but during the winter months when the temperature of the greenhouse is congenial they flower bountifully and their prolonged period of bloom gives opportunities for study and close acquaintance. It has been urged by some that Orchids out of flower are the reverse of ornamental, and this is true of some genera. Cypripediums, however, are rich in luxuriant leaf-growth, and not a few of them are worthy of cultivation for this feature alone, the deep green leaves being exquisitely marbled and variegated. Their growing popularity is attested by the fact that some of the more common species, like C. insigne, furnish cut flowers by the thousand for the New York market. To the amateur a little house of Cypripediums will give hours of infinite pleasure in winter, and hundreds of plants can be accommodated in a modest structure. The original wild species from many lands would of themselves furnish a rich store, but the hybrids of the last decade alone have here given us additional forms and colors in almost infinite variety. In fact, the hybrids are the majority among Cypripediums, and there is an endless fund of delight in comparing them, observing traits so plainly inherited that the parentage of many plants can be absolutely vouched for.

Cypripedium insigne is the type of quite an extensive family,

of which many members show marked improvements on the original. It is a native of Nepaul, introduced early in the century, and now has over forty named varieties. One of the finest of these forms which we now have in flower is C. insigne Colsonianum, sent out from the Short Hills nursery. The very large dorsal sepal is the feature of the flower, the breadth and purity of its white margin being especially noticeable; in fact, nearly one-half of it is of this color, the base having the characteristic apple-green tint with prominent brown spots, the petals gracefully undulated, with the abundant spots disposed in a regular horizontal alignment. Of quite a different type is the dwarf variety Eyermannianum. Its dorsal sepal is of a transparent greenish-yellow tipped with white, the petals and pouch also pale, unspotted, faintly lined, but the staminode is of a conspicuously rich yellow hue. C. nitens, a hybrid between parents C. insigne Maulei and C. villosum, is handsome and blooms freely. Its bold chocolate-spotted dorsal sepal shows the blood of C. Maulei; light brownish yellow petals, glistening like those of its other parent, are faintly lined with brown, infolding toward the polished light brown lip. Forms of the well-known hybrid C. Leeanum are now numerous and most interesting. The characteristics of C. Spicerianum predominates in all these forms so much that there is little apparent trace of C. insigne Maulei, or the other parent C. Maulei. The best of the several forms we have is that known as Masureelianum, which was also sent out from the Short Hills nursery, and now has several fine flowers open. Its dorsal sepal is very large and of elegant curvature, recurving at the base till the edges overlap, and looking at the dorsal sepal from behind it is in shape a perfect miniature of the Arum Lily, in pure white. In front it is marked with broken lines and dots of light purple, but there is a broad margin of purest white. The insigne influence is apparent in the petals which, gracefully undulated along their edges, are brownish yellow, spotted with a darker brown pouch of a similar hue, but its inner surface pitted with innumerable tiny red dots. Other good forms of C. Leeanum in flower are Giganteum, Burfordense and Superbum, all sufficiently distinct to justify their varietal names, while Pulchellum is quite a little gem with a neat flower, the dorsal sepal much contracted, green tinged and lightly spotted, the petals narrow and decidedly drooping, the pouch short, with a widely expanded aperture, while the staminode differs in color from the previous named forms and attracts notice in consequence by reason of its exquisite mauve color, the yellow protuberance in its centre standing out in rich contrast.

Cypripedium macropterum, a Veitchian production, is a hybrid between C. Lowi and C. superbiens. We have a noble scape of this, carrying two fine flowers and a bud yet to expand. The open flowers with their long horizontally poised petals measure nearly six inches across. The dorsal sepal is of a quaint shade of gray-green, lined and suffused with brown at its base. The petals are long, making a flower of graceful outline, as they depend somewhat at their tips, describing quite a semicircle. They are somewhat narrow at the base of attachment, but broaden toward their extremities, the broader half being of a light glistening, uniform mauve-purple, while the anterior portions are heavily dotted with shining black spots. The pouch is light brown. C. Harrisianum is as well adapted to grow in quantity for cutting as C. insigne, while some of its forms are highly conspicuous, as, for example, Superbum, a truly superb form in every respect. This has a very large dorsal sepal of exquisite coloring, a kind of mahogany-red in vertical lines running up the sepal over a lighter shade of purple-red diffused through the sepal, save a well-defined narrow margin of white. The petals are a rich purple-red in the upper half, but the lower portions much paler-tinted and faintly lined with green. The lip is prominent, of a claret-purple shading toward green at its tip. The variety Pitcherianum shows distinctive traits compared with its immediate relative.

Cypripedium Lawrenceanum, a Bornean species discovered by Burbidge in 1878, is a noble Cypripedium, as beautiful in leaf as in flower. It is represented in our collection by a very fine form, indeed, named Giganteum. Though a small plant, it carries an immense flower on a stout stem over one foot high. Its dorsal sepal is a study of rich coloring. Mainly white, it shades to light green at the base, while broad vertical lines of claret-purple of varying length streak the sepal, and their color is faintly diffused through the white body-ground. The petals are light green, ciliated along their edges, while half a dozen black spots are distributed along the upper and lower borders of both petals. The pouch is large, of a light brownish green, pitted inside with dark purple dots. C. Niobe Shorthillense flowers with great freedom, a plant in a three-inch pot carrying six perfect flowers. The influence of one of its parents, C. Spicerianum, is most marked in the dorsal sepal, which is white, heavily lined and suffused with purple, the base of the sepal a brownish green. The petals have the graceful undulations and show characteristics of its other parent, C. Fairreanum. They are lined and suffused with chocolate on a greenish yellow ground, the short pouch glistening as though polished, being of the same tone of color. Another dainty gem of Spicerianum parentage is C. Hebe, which was raised at Short Hills; a tiny plant has two perfect flowers. It has a broad dorsal sepal, mainly white, but with a distinct band of purple right down the centre, and a few spots and suffusions of the same tint on the white ground color. It has short, narrow, wavy petals spotted with brown on greenish yellow, a short, broad pouch with infolding lobes, externally light chocolate, internally profusely red-spotted. C. Arthurianum is a lovely hybrid with C. insigne and C. Fairreanum for its parents. It is a dwarf grower, neat and free in flowering, its dorsal sepal bright green, tipped with pure white and penciled with brown in broken lines. Its wavy, drooping petals impart to the flower a graceful expression. They are lined and spotted with brown, the pouch also similarly tinted. Other Cypripediums of interest also in flower are C. concinnum transparens, quaintly colored in rosy purple and white, with a peculiar transparent lustre; C. regale, of marked distinctness, noteworthy for its clean-cut, regular form, its dorsal sepal tipped with white and streaked with dark olive-green, petals and pouch colored in a pretty harmony of brown and green; C. luridum in two forms; C. Mrs. Edward Warren Hook, with a polished purple-red flower of bright and attractive coloring, and C. Tonso-villosum, a comparatively colorless hybrid with fine flowers in subdued tones of brown, green and yellow.

Madison, N. J. *A. Herrington.*

Nepenthes.

PITCHER-PLANTS are for the most part more interesting than showy. The flowers being inconspicuous, their chief beauty is in what is commonly called the pitchers. The genus comprises a considerable number of species and varieties, and the form or color of the pitchers constitutes the chief distinction, though they vary considerably in size, texture of leaf and vigor of growth. They are generally considered plants of easy culture, but this greatly depends upon the facilities. It is almost useless to attempt to grow them in an unsuitable house or in one in which the proper atmospheric conditions cannot be maintained. They require abundant atmospheric moisture at all times, but fresh air is also necessary. I have seen them grown in a house with a northern elevation, but one with a southern elevation is preferable, though, of course, it will require slightly more shade. This shading should in no case be overdone, for, in our experience, they have stood a greater amount of light than is usually allowed. It is only necessary to break off the strong sun rays, and for this purpose light muslin or cheesecloth is useful. The usual means of propagation is by cuttings. Several methods of striking are adopted, but the simplest and most convenient is to firmly insert the cuttings made from well-ripened one-year growths, singly, in small pots filled with sharp clean sand. These are plunged in a propagating-case where a good bottom-heat can be maintained, and kept liberally sprinkled with water heated to the same temperature as that of the case. We make the cuttings from single joints, with leaf attached, cutting from one to two inches below and one inch above the leaf. The longest of the leaves are sometimes shortened to save space, but otherwise this is not necessary. After striking, the first shift is made into three-inch pots; the principal material used is fibrous peat, with a surface covering of sphagnum-moss, and the whole should be firmly packed in the pots or baskets. We prefer to plant in baskets after the plants have attained sufficient size. The moss on the surface helps to retain the moisture, for lack of which they should never be allowed to suffer. If plenty of water is not given, the pitchers will become shriveled at an early stage of their formation, and the leaves will lose their bright green color and assume a reddish tint. During the summer months syringing will be required three or four times a day. In winter less syringing will answer, but hard firing will necessitate the frequent application of water to the pathways and brickwork of the house to guard against a drying atmosphere. This syringing and damping also serves to keep down red spider, the most dreaded insect enemy. We try to maintain a night temperature of about sixty-five degrees during the winter months, allowing a rise of about ten degrees by day. For the summer months, of course, it is impossible to lay down a hard and fast rule. As Nepenthes grow rapidly we find it desirable to shorten back or cut them down every season. They break very readily. If allowed to run they incline to produce flowers

rather than pitchers. A few may be allowed to flower and ripen their seeds if it is intended to raise young plants by this means. Hand pollination is necessary, as the male and female flowers are produced on different spikes, and in some cases on different plants. The variety N. Veitchii, for example, usually produces female, while N. lanata generally throws

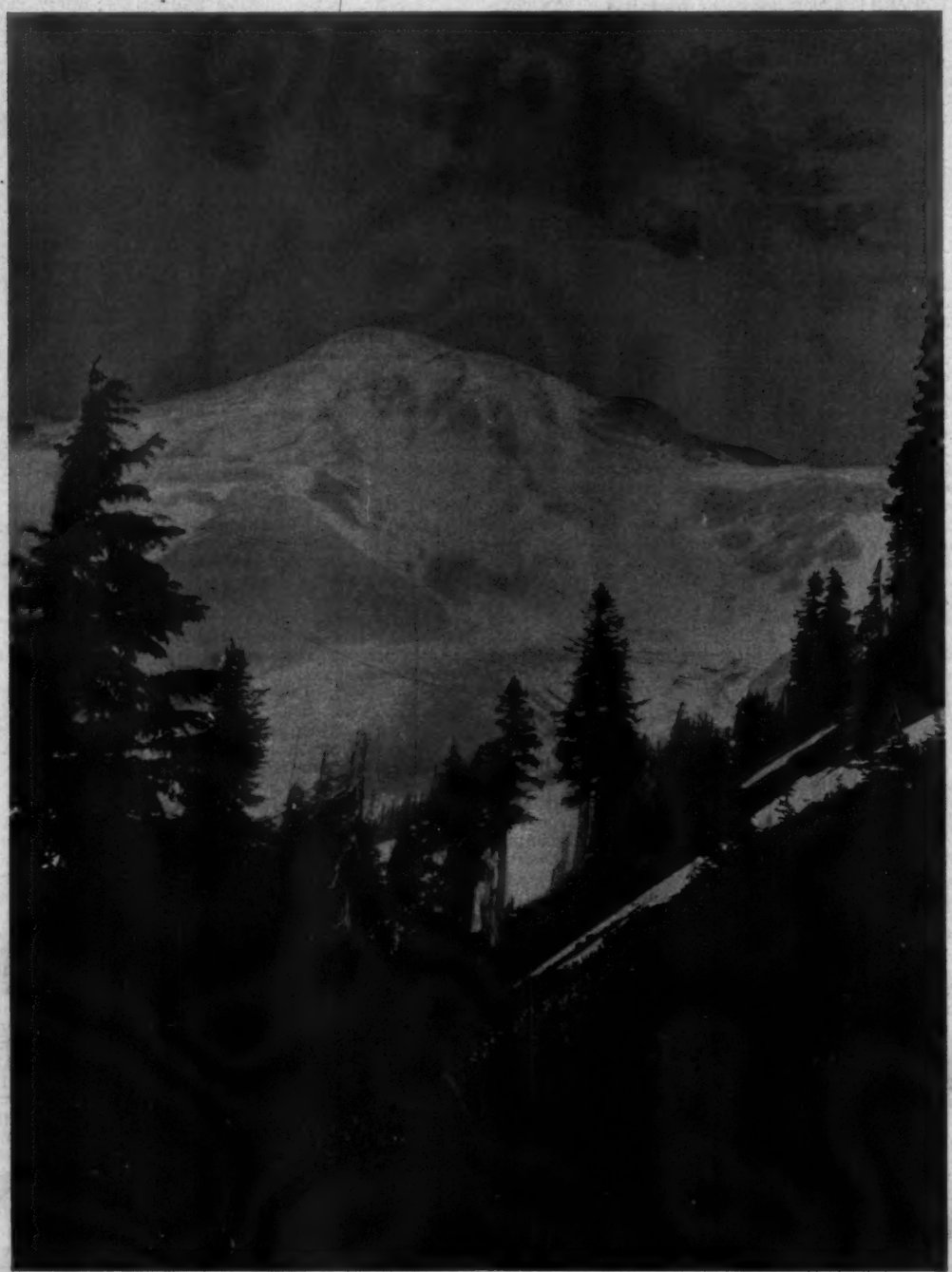

Fig. 1.—Patton's Spruce, Tsuga Pattoniana, on Mount Ranier.—See page 1.

male flowers, though this should not be taken as a hard and fast rule. The seed takes several months to ripen, so that the work is somewhat slow, though none the less interesting. When nearing the ripening stage a close watch should be kept or the pods may burst and the seeds drop out. The seeds should be sown in pans as soon as gathered, in a compost of chopped sphagnum and peat, with a little sand. A good percentage of the seed will germinate, providing it has been well ripened, but in a minimum temperature of sixty-five degrees it will take from two to three months. When large enough the plants should be set singly into smallest size pots, using the same compost as for sowing the seed. The pots should be plunged in moss. It is a good plan to plunge them in pans or boxes, as they can then be readily shifted about, and it is thus easy to place them in a lighter situation. Additional shiftings must be attended to when required. The raising of these seedlings requires considerable patience, as it takes about three years of careful watching before the result

of the labor is shown, and another year before it is certainly determined. A great majority of the seedlings usually turn out well, however, and, strange to say, scarcely any two are alike, a fact which accounts largely for the numerous varieties found in cultivation.

Tarrytown, N. Y. *William Scott.*

Fig. 2.—Patton's Spruce on Mount Ranier.—See page 1.

Hints on Propagation.

MANY plants are quite readily propagated during the winter, more easily, in fact, than in spring, when the sun is stronger, and the vitality of cuttings is quickly exhausted unless they are carefully watched. Among the useful plants for outdoor decoration is the variegated Arundo donax, and this is a good time to prepare for its increase. One of the most satisfactory ways of working up a stock is by treating the canes of last season's growth just as Dracæna canes are handled—that is, by laying them down in a propagating bed and just covering them with sand or a mixture of sand and sphagnum, or sand and cocoa fibre. If kept thoroughly moist, these canes will break from nearly every joint, and the young shoots will emit roots and may then be cut from the parent cane and potted up. The same result is sometimes secured when these canes are placed in a tank of water in a warm house, and I have seen an excellent crop of young plants

raised from canes that were laid in a shallow pond outdoors in the summer.

Pandanus Veitchii roots now, and a point worth remembering about Pandanus cuttings in general is, that they root more quickly when kept a little on the side of dryness and only have water enough to prevent shriveling. This rule also applies to cuttings of variegated Pineapple and to various other Bromeliads.

The reference to Dracæna canes suggests the hint that nice top cuttings of these plants can usually be rooted without loss of foliage by nicking the stem with a sharp knife and then mossing up the wound, imitating the treatment often given to Ficus elastica. Strong, brightly colored Croton tops may be managed to advantage in the same way. To have finely colored Crotons it is wiser to select the cuttings to some extent, for while some varieties seem to color up well without special selection, yet there are others that cannot be relied on unless the cuttings are well-marked growths. With both Dracænas and Crotons the best results are obtained from strong young plants that have not been stunted in any way, but grown on rapidly by good feeding.

Fatsia papyrifera and F. Japonica, both of which are useful in the conservatory and in the outdoor garden, may be increased by means of short sections of the stronger roots, buried to a depth of half an inch in sand or light soil in a moderately warm greenhouse. These plants also come freely from seeds, but where the stock is small the roots are more readily obtainable. Root-cuttings, too, offer a practical way to propagate some of the Clerodendrons and Bignonias, for by this means a stock may be obtained with less trouble than by top cuttings. Cuttings of Roses, and of Tea Roses particularly, are just now in order, and the wisdom of a proper selection of good healthy growth for this purpose will be apparent to every one who makes the experiment.

If suitable roots of Clematis flammula or C. Vitalba are at hand they may now be used for stocks on which to graft some of the finer varieties, and a little work of this character will furnish a pleasant variety in the routine of the season. The roots used for this purpose should be stout, clean and free from bruises, and the scions made from firm clean wood. Cleft-grafting is the most convenient method. After grafting, the plants should be buried in sand in slight bottom-heat until the union has taken place, after which they may be potted up into small pots.

Holmesburg, Pa. *W. H. Taplin.*

Climbing Plants for Indoor Decoration.

ONE of the very best of this class of plants to train about a window is Maurandia Barclayana, a native of Mexico, with showy blue or purple flowers shaped like those of an Antirrhinum, although the tube of the corolla is not enlarged at the base and the so-called palate is not so prominent. These plants are easily grown from seed and can be lifted from the open ground early in autumn, or they can be planted in good-sized pots and sunk out-of-doors during the summer. They are easily supported on cords, about which they twist their petioles, and they have delicate hastate leaves which are most attractive. They bloom abundantly all winter long.

Another good plant is Cobæa scandens, which has pinnate leaves with tendrils and large greenish-purple flowers, which are bell-shaped and very abundant. It can also be grown from seed and treated like an annual. It grows very rapidly and can be carried away from the light along the ceiling of a room, and in this position, out of the direct sunshine, the flowers are bleached white and very interesting. Solanum jasminoides is another admirable plant for this purpose, producing clusters of pure white flowers, which in the variety known as grandiflorum are an inch across. This plant will grow out-of-doors in the summer-time perfectly well, and there is no better one for the decoration of verandas at that season, or of windows in the winter, as it seems to endure the dry heat of a house much better than most others. It belongs to the same family as the Potato, as any one can see by a single glance at its flowers. It was introduced from South America more than fifty years ago, and recently it has become quite common. Manettia bicolor is another good plant of this sort, with lance-shaped leaves and flowers with tubes of bright scarlet and yellow segments. A good annual plant is Thunbergia alata, which can be propagated from seeds like the Maurandia. It has white or buff-colored, salver-shaped flowers, often with a dark throat. The Butterfly Vine, Stigmaphyllum, with heart-shaped leaves and bright yellow flowers, is rather harder to manage than the others, but it is a beautiful plant for sunny places, and it flowers abundantly in small pots. It is a graceful plant with slender stems. The Ivy-leaved Geranium has a rich glossy foliage and clustered flowers of a great many colors. It is as easy to grow as the common Geranium, and can be trained on cords, but it is better to droop around the edges of the vase or from a hanging basket.

Orange, N. J. *J. A. Don.*

Correspondence.

Dendrolene.

To the Editor of Garden and Forest:

Sir,—The communication from Mr. Troop, in the number of Garden and Forest for December 2d, requires a statement from me.

In Bulletin 111 of the New Jersey Experiment Station, I gave the results of a season's test of "Raupenleim" and "Dendrolene." Raupenleim, an old German preparation, is too expensive in the United States to be of practical value to our farmers, and the effort was made to obtain a native substance that would answer the same purposes at less cost. Professor F. L. Nason, to whom I suggested the matter, thought he could get a material that would answer as well and would be essentially the same as the European product.

Professor Nason was not then and never has been connected with the New Jersey Experiment Stations, and the Dendrolene was not in any sense the result of any investigations made by the Station, nor are we responsible for the statements of any advertisement. The results of my experiments, as given in Garden and Forest, were exceedingly satisfactory, and those results were accurately stated. Up to the time of publication of my annual report for 1895 no injurious effects were observed on any of the trees under observation in New Jersey. It is to be noted, however, that in my record of experiments only two young trees were treated. On page 10 of Bulletin 111, the condition of these trees on September 3d is noted, and it is stated that the European material was the one employed on them. The effect of the material on very young trees, therefore, was not a matter of direct or special experiment. It is certain that none of the older bearing trees in the Durand orchard were in any way injured by the material applied. Early in the present year (March or April), the Messrs. Durand informed me that the two young trees which were coated the entire season of 1895 were still healthy.

On the White orchard of Peach-trees, where the material was applied to keep out the Peach borer, and where hundreds of trees were treated, so sign of any injury was to be seen at the time my bulletin went to press. In the spring of 1896 it was found that there had been considerable penetration through the thin bark of the youngest trees and and an apparent check in growth. The injury did not extend to the inner bark, but was taken as a caution and no new coating was applied. It was found, on examination, that the Dendrolene had gradually penetrated the bark tissue of the younger trees, killing the cells as far as it went, and, of course, interfering with the proper circulation of the sap. In the most extreme cases there was a perceptible constriction of the trunk, as if made by a tight band; but this was only found on a few of the youngest trees, not yet in bearing. On the larger Peach-trees no harm resulted, and apparently the material did not get through the dry and hard outer tissue. The Bowker Company was notified of these facts before the beginning of May, and was requested to caution purchasers of their material on these points—especially those intending to use it on Peach-trees, and to discourage a continuous application in any case. It was intended during the season of 1896 to make a thorough test of Dendrolene, mixed with a variety of substances that would reduce its penetrating power, but the experiments were not carried out, on account of my absence.

Dendrolene, so far as I know, contains no caustic and no acid. It is absolutely neutral to all ordinary tests, and the injuries, so far as any have been caused by it, are due to the fact that it very gradually penetrates into thin, active, growing tissue, especially where it gains nutriment of any kind from without. In no case was fully matured outer bark penetrated by the material; only the very young, growing tissue. Furthermore, so far as my observation extended, the penetration is extremely slow, not being noticeable on the young Peach-trees until almost a year from the date of the application. I am yet confident that the material is a good one and that it will serve a useful purpose, though more widely different than I had supposed from the Raupenleim. It will require, however, much more experiment before its true place is ascertained, and its range of usefulness will probably be much more restricted than I hoped at first, and believed. At all events, it will be

well to exercise care in applying the material on young trees, and I would not now advise any application to remain permanently.

Rutgers College. *J. B. Smith.*

Recent Publications.

The Timber Pines of the Southern United States. By Charles Mohr, Ph. D. Together with a Discussion of the Structure of their Wood. By Filibert Roth. Washington: Government Printing Office.

These monographs have been prepared under the direction of Mr. B. E. Fernow, Chief of the Division of Forestry of the United States Department of Agriculture, for the purpose of giving a true conception of the "extent, condition and value of the pineries of the south and of the nature, development and characteristics (botanical, silvicultural and technological) of the Pines in that region, with the hope of inducing natural forestry methods in their use and reproduction." This purpose has been well carried out, and the bulletin will take rank among the most instructive publications of the department.

Dr. Mohr's part of the work consists of about a hundred quarto pages, and since he has been a frequent contributor to these columns our readers need not be told how thoroughly he has studied these interesting forests, and how clearly and how carefully he has treated the subject from both scientific and economical points of view. Of course, the greatest part of his work is devoted to the Long-leaved Pine, Pinus palustris, the great timber-tree of the south, which is found in the maritime belt about 125 miles wide, sweeping along the coasts of the Atlantic and Gulf from the southern boundary of Virginia to the uplands which border on the Mississippi River bottom. The wood of this Pine is unsurpassed by that of any other conifer for purposes of construction, and equal to that of almost any timber-tree in economical importance, so that it has always been in great demand for naval architecture, for civil engineering and for all purposes of heavy construction. Both for home use and for export it has been recklessly cut, while the manufacture of naval stores from its resin is one of the most largely developed industries of the southern states, as well as one of the most wasteful industries now prosecuted by civilized man. Investigations by the Division of Forestry have shown that the boxing of a tree does not injure the strength or durability of its heart-wood, but if the tree is left standing, the wound, of course, interferes with healthy growth, while beetles bore their way into its trunk, and spores of fungi find entrance to cause decay. Worse still, the exuded resin so increases the inflammability of the woods that a fire once started soon sweeps over a large area, not only destroying the standing timber, but excluding all hope of new growth. The first plate in this volume, which shows a stretch of this Pine land after the merchantable timber has been removed, presents a scene familiar to every traveler in the coast region. The trees are spindling, scattered, blackened with fire, and this desolated forest makes one of the most depressing landscapes that can be imagined. Throughout the area of nearly a hundred thousand square miles over which the Long-leaved Pine extends, a stupendous amount of timber-wealth still remains, in spite of the immense amount of land that has been cleared for agricultural purposes, and the large sections from which the good timber has been culled out or the original growth entirely destroyed. But when we remember that the present annual cut will increase as the northern Pine gives out, it is clear that the logger is far outstripping the possibilities of these woods for reproduction, and if the naval store industry is continued in the same profligate way, and the devastation by fire and domestic animals is not arrested, their extermination for all practical purposes is certain. During the earliest part of its development the Long-leaved Pine grows slowly, so that the young trees are easily suppressed by competing species even under the best conditions. Again, it is impatient of shade and needs direct sunlight both for germination and for growth. Besides this there are only occasional seasons when it seeds abundantly, and if the seed falls in a wet, undrained soil its sprouting power is lost. Left to the ordinary course of nature, then, the Long-leaved Pine would have a small chance of successful reproduction, but when to its ordinary enemies the influence of man is added, we can easily see why its offspring rarely takes the place of the parent tree, even in regions most favorable to its natural renewal. The economic conditions of the present are hardly such as to justify an attempt at artificial reforestation, but the importance of this valuable timber to the industrial and commercial prosperity of the people of the country which it inhabits ought at least to suggest to the owners that its natural reproduction should be encouraged.

The Cuban Pine, Pinus heterophylla, has a greater capacity for natural reproduction than the Long-leaved Pine, and it is easier to renew in forest artificially. It grows with greater rapidity; it furnishes timber of large dimensions as good as that of P. palustris, and it yields resin in abundance. On this account, Dr. Mohr concludes that for reforesting the low Pine lands of the southern-coast region, where it is already making an aggressive growth, it is to be preferred not only to any tree within its original habitat, but that it will be useful far beyond the range of its natural distribution. Very interesting, too, is Dr. Mohr's account of the Short-leaved Pine, Pinus echinata, which stands next to P. palustris in the importance of its timber. The wood takes as good a finish, and is more easily worked, being softer and containing less resinous matter than the timber of the Short-leaved Pine, and it is therefore often preferred by the cabinet-maker and house carpenter. Fortunately, too, the tree produces abundant crops of seed almost every year, and it makes a successful struggle with competing trees in the shade or sun, so that it soon takes possession of the soil with a little assistance from the hands of the forester. It is also of great advantage to the farmer because it furnishes him with an easy method of restoring a tree covering to denuded uplands.

The Loblolly Pine, Pinus tæda, is a tree of more economical importance than was once supposed. It is as aggressive a grower on the coast plain as the Short-leaved Pine is on the rolling uplands of the interior. The rapidity with which it colonizes clearings and old fields has given it the common name of Old Field Pine, and the tenacity with which it retains the ground which it has once possessed for its own seedlings, points to its value in forest management. It also produces abundant seeds, it grows rapidly, and although the timber is in some respects inferior to that of the Long-leaved and Cuban Pines, it will probably play quite as important a part in the forestry of the future as will the Short-leaved Pine.

The Spruce Pine, Pinus glabra, is the only really soft Pine of the southern states. It is the least common of the Pines of this region, never forms extensive forests, and for the most part is scattered among broad-leaved trees, both deciduous and evergreen. It has, however, the great advantage of thriving under shade, and for which purpose it will, no doubt, be largely used by the trained foresters of this region in generations to come.

The wood of all these trees is similar, not only in appearance, but in minute structure, and the characteristics and anatomy of each, as concisely recorded by Dr. Roth, who has charge of the timber physics of the department, make an extremely interesting paper. The discussion of such points as the differences between sap and heart-wood, and between spring and summer wood, and the like, are illustrated by plates of cross-sections, magnified views of resin ducts and other histological details, so that even the general reader can find much to claim his attention. Mr. Fernow contributes an introduction to the whole, in which he sums up the work of Dr. Mohr and Mr. Roth. He offers diagrams to show the comparative growth of average specimens of the different species during a given time, in height, in diameter and in volume, and, altogether, he makes a clear summary of

the work for the general reader. Judging from the best data at hand, Mr. Fernow concludes that the pine timber standing and ready for manufacture may reach two hundred thousand million feet, while the lowest annual consumption of the future will probably be seven thousand million feet. He does not, therefore, prophesy that the pine supply of the south will be exhausted in forty or fifty years, for if we should begin rational forestry now, the forests may be kept as a source of natural supplies even though these supplies are reduced. But, after a review of the recuperative powers of the various species, he says: "Considering that the timber on which we now rely and on which we base our standards came from trees usually from 150 to 200 years or more old, and that none of these Pines make respectable timber in less than from sixty to 125 years, the necessity of timely attention to their renewal is certainly apparent." To this moderate statement every thoughtful person will give unqualified assent.

Notes.

The bushy tops of branches of young Long-leaf Pine-trees were among the handsomest offerings for decorations during the holiday season. Gray Spanish moss and large Palmetto-leaves, also from Florida, were more freely used than ever before, and the supply of English and southern mistletoe was all sold before Christmas Day.

Mr. I. H. Cammack, in a recent address before the Southern California Fruit-growers' Institute, says that the Anona Cherimolia, the tree which produces the chermoyer, is now growing in several places in California, and it probably will thrive in any climate not too severe for the Lime. The fruit matures in the winter and spring, and it can be gathered while firm and shipped for several days' journey successfully. The color of the fruit is brownish yellow with a reddish cheek. It is somewhat heart-shaped, contains few seeds, and it is very rich and is considered by many as a most delicious fruit, although it is not relished by all persons when they first taste it. The trees come nearly true from seed and begin to bear about the fourth year.

The Roselle, Hibiscus Sabdariffa, is a native of tropical Asia, resembling the Okra in growth, possessing great resistance to drought and yielding an acceptable food-product. It has been tried in agricultural stations of southern California, where it is said to be ornamental, with dark red stems and pods showing through rather scanty green foliage. The juice from the fleshy calyces makes a cooling acidulous drink and is useful for jelly. The mucilaginous properties of the juice render the setting of the jelly certain, and its dark cherry color and sprightly acid make it very desirable. As it will grow in hot, arid situations, Mr. Wickson, of the Experiment Station at Berkeley, is distributing seed to those parts of the state where it will thrive.

Winterberries may now be seen in the wholesale markets by the crate, and cost fifteen cents a quart. Large bright red Tangerines, from Florida, cost sixty-five cents a dozen, and the smaller and paler Mandarins, from Italy, sell for the same price. Grape-fruit, which is becoming scarce, costs twenty-five cents for large fruits of even color, from Florida. Coe's late red plums are still seen in some of the high-grade fruit-stores, and luscious, fully ripened persimmons, from Florida, the latter costing $1.50 a dozen. Small round baskets holding fifteen beautifully grown strawberries, picked with long stems, sell for $2.25 to $3.00. Hot-house melons, Spanish melons and prickly pears may be had at fancy prices. The last of the Comice pears were sold during the holiday season, and the russet Winter Nelis, the deep green Easter Beurre, the bright Forelle and spicy Seckel pears are now among the best. Small Strawberry pineapples, from Florida, cost fifteen cents each, and large Abaco pineapples, grown under shelter, from Orlando, in the same state, cost $1.00. Mushrooms, cucumbers, tomatoes as even and showy as any choice fruit, and asparagus, are offered in the best fruit-stores. The latter vegetable is tied in bunches containing a dozen stalks a foot in length, and costs $1.00 for this quantity.

The possibility of growing Cauliflower under glass with profit was last year tried in the Missouri Botanical Garden, and at the meeting of the Society for the Promotion of Agricultural Science, held in Buffalo last summer, Mr. H. C. Irish gave an interesting account of the methods of cultivating the crop. An interesting part of the experiment was the successful growing of Lettuce between the rows of Cauliflower. Lettuce will not mature good crops among the Cauliflower-plants unless they are set eighteen inches apart, but since a given area will produce nearly as much Cauliflower in weight when the plants are set at this distance as it will when the plants are set more closely, it is possible to get crops of both vegetables, and the lettuce will be clear profit beyond the income of the Cauliflower. Later on, Cucumber-vines were set around the sides of some of the benches between the Cauliflower, with a view to training them up the roof, and others to run over the benches when the Cauliflower were removed. A row of Chervil was also planted around the sides of the benches, from which many leaves were cut for garnishing, and it proved to be a good plant for that purpose. Mr. Irish estimates that since one man could attend to a house 170 feet long by twenty-four feet wide, with two walks and 100 square feet of bench-room, that the cauliflower, lettuce and cucumbers would bring in the winter a total income which might amount to $1,150, which, after deducting expenses, would be something over $860 for interest on the investment and the labor of one man.

Bulbous plants are now represented in the florists' windows by flowers of Freesia, Daffodils, Chinese Narcissus, Roman Hyacinth, Lily-of-the-valley, Lilium Harrisi and L. longiflorum. The yellow and white French daisies, white lilac, forget-me-nots, sweet peas, camellia, daphne odorata and showy bracts of poinsettia are noticeable. In collections of standard varieties of roses Ulrich Brunner and Magna Charta are occasionally seen, and the comparatively new President Carnot. Many lots of Orchids and other costly flowers were frozen in transit to the wholesale dealers during Christmas week, and the prices and sales of cut flowers were greatly affected by the cold weather. Much of the stock had been held back for the holiday trade, and the proportion of low-grade flowers was thus unusually large. As the dealers handle only the best stock and the Greek street venders could not carry on their trade, sales were limited to the best grades, and immense quantities of poorer flowers remained unsold and went to waste in the wholesale establishments. Red carnations were in marked favor, and Meteor, Portia and Garfield sold readily at fair prices, as did good yellow carnations, while there was almost no demand for white ones, and pink varieties sold slowly, except those of the highest quality. On Christmas and the day preceding about 1,700 bunches of violets, each containing a hundred blooms, were bought by retail dealers. American Beauty roses were most in demand in their class, and selected flowers sold at retail for $2.50 apiece. The Christmas trade in cut flowers was, altogether, satisfactory to the retail dealers. Growing plants in fancy baskets were more popular than ever before. New Year's day failed to stimulate the flower trade, and the day was scarcely more busy than an ordinary Saturday during the winter season.

According to the London *Times*, the forests of western Australia are exceedingly rich in trees of economic importance, among which the Jarrah, or Eucalyptus marginata, is now the most important. In constructive work, where wood is brought into contact with soil and water, this timber is superior to that of any other wood in that forest. A healthy tree of average size is from ninety to a hundred feet high and from two and a half to three and a half feet in diameter at the base, and it will grow so as to produce logs two feet through at the base in about fifty years. It grows in sections where the rainfall ranges from thirty-five to forty inches in the year, and the wood when dried weighs sixty pounds a cubic foot. It is red in color, takes a good polish, is easily worked, and is good for piles, bridges, boats, furniture, railway-sleepers and charcoal. It is usually found mixed with or near the Karri, or Eucalyptus diversicolor, a giant species, straight and regular in growth, umbrageous in appearance, good specimens being two hundred feet high, four feet in diameter breast-high, and with a stretch of 120 to 150 feet from the ground to the first branch. It is a rapid grower and will produce marketable timber in from thirty to forty years. This wood is red in color, very much resembling that of the Jarrah. Its texture is hard and heavy, and it is tough and not easily dressed. For bridge planking, flooring and beams it is unequaled by any wood in the colony. Karri timber is largely exported to London for paving the streets since its surface is not easily rendered slippery. There are other valuable trees in this forest, the timber in which is estimated to be worth more than six hundred million dollars. Two thousand men are now employed in cutting timber, and the output last year represented a gross value of two million dollars, and this will be increased by the end of the century to at least ten million dollars.